Listing of the Claims

Please cancel claims 40-63 without prejudice as drawn to a non-elected invention.

1. (Currently Amended) An electroluminescent device comprising:

an inorganic phosphor configured to produce electroluminescence from the recombination of injected holes and injected electrons;

a controllable hole injection structure in contact with the inorganic phosphor; and

a controllable electron injection structure in contact with the inorganic phosphor and separated from the controllable hole injection structure by a recombination region of the inorganic phosphor, the electron injection structure being controllable independently of the controllable hole injection structure.

2. (Original) The electroluminescent device of claim 1, wherein a first applied control voltage controls a rate of hole injection into the inorganic phosphor.

3. (Original) The electroluminescent device of claim 1, wherein a second applied control voltage controls a rate of electron injection into the inorganic phosphor.

4. (Original) The electroluminescent device of claim 1, wherein a third applied voltage controls an electroluminescence intensity produced by the device.

5. (Original) The electroluminescent device of claim 1, wherein a first applied control voltage controls a rate of hole injection into the inorganic phosphor;

a second applied control voltage controls a rate of electron injection into the inorganic phosphor independently of the first applied control voltage;

a third applied control voltage controls an electroluminescence intensity produced by the device independently of the first and second applied control voltage.

6. (Original) The electroluminescent device of claim 1, wherein the inorganic phosphor is selected from the group consisting of ZnS, SrS, BaS, CaS, ZnO, ZnSe, GaN, and GaP.

7. (Original) [[The]]An electroluminescent device ~~of claim 1,~~ comprising:

an inorganic phosphor configured to produce electroluminescence from the recombination of injected holes and injected electrons;

a controllable hole injection structure in contact with the inorganic phosphor including:~~wherein the controllable hole injection structure comprises:~~

a hole injection region in contact with the inorganic phosphor and configured to receive a hole-injection bias voltage[;], and

a field effect gate structure in contact with the inorganic phosphor substantially opposite the hole injection region and configured to receive [the]a first applied control voltage; and

a controllable electron injection structure in contact with the inorganic phosphor and separated from the controllable hole injection structure by a recombination region of the inorganic phosphor.

8. (Original) The electroluminescent device of claim 7, wherein the field-effect gate structure further comprises a portion extending beyond the edge of the hole-injection region and towards the recombination region.

9. (Original) The electroluminescent device of claim 7, wherein the hole injection region has a thickness less than a thickness of the inorganic phosphor.

10. (Original) The electroluminescent device of claim 7, wherein the hole injection region is formed from the same material as the inorganic phosphor.

11. (Original) The electroluminescent device of claim 7, wherein the hole injection region is formed from a high work function metal.

12. (Original) The electroluminescent device of claim 11, wherein the high work function metal is selected from the group consisting of Au, Pt, Pd, and Ni.

13. (Original) The electroluminescent device of claim 7, wherein the hole injection region is formed from a p-type doped semiconductor.

14. (Original) The electroluminescent device of claim 13, wherein the p-type doped semiconductor is selected from the group consisting of NiO, Cu.sub.2O, Co.sub.3O.sub.4, SrCu.sub.2O.sub.2, CuAlO.sub.2, CuYO.sub.2, CuScO.sub.2, CuCrO.sub.2, CuInO.sub.2, BaCu.sub.2S.sub.2, LaCuOS, and GaN.

15. (Original) The electroluminescent device of claim 7, wherein the field effect gate structure is fabricated of transparent material.

16. (Original) The electroluminescent device of claim 7, wherein the field effect gate structure comprises:

an injection control gate; and

an injection control gate insulator layer interposed between the injection control gate and the inorganic phosphor.

17. (Original) The electroluminescent device of claim 16, wherein the injection control gate is formed from a transparent, conductive material.

18. (Original) The electroluminescent device of claim 17, wherein the transparent, conductive material is selected from the group consisting of In.sub.2O.sub.3, SnO.sub.2, and ZnO.

19. (Original) The electroluminescent device of claim 7, further comprising a hole injector contact in contact with the hole injection region.

20. (Original) The electroluminescent device of claim 19, wherein the hole injector contact is also in contact with the inorganic phosphor.

21. (Currently Amended) ~~The~~An electroluminescent device ~~of claim 1~~, comprising:

an inorganic phosphor configured to produce electroluminescence from the recombination of injected holes and injected electrons;

a controllable hole injection structure in contact with the inorganic phosphor; and

a controllable electron injection structure in contact with the inorganic phosphor and separated from the controllable hole injection structure by a recombination region of the inorganic phosphor wherein the controllable electron injection structure ~~comprises~~includes:

an electron-injection region in contact with the inorganic phosphor and configured to receive an electron-injection bias voltage; and

a field effect gate structure in contact with the inorganic phosphor substantially opposite the electron-injection region and configured to receive ~~the second~~an applied control voltage.

22. (Original) The electroluminescent device of claim 21, wherein the field-effect structure further comprises a portion extending beyond the edge of the hole-injection region and towards the recombination region.

23. (Original) The electroluminescent device of claim 21, wherein the electron injection region has a thickness less than a thickness of the inorganic phosphor.

24. (Original) The electroluminescent device of claim 21, wherein the electron injection region is formed from the same material as the inorganic phosphor.

25. (Original) The electroluminescent device of claim 21, wherein the electron injection region is formed from a low work function metal.

26. (Original) The electroluminescent device of claim 25, wherein the low work function metal is selected from the group consisting of Ca, Li, K, Na, Mg, Sc, In, Al, Ti, Ta, and Ag.

27. (Original) The electroluminescent device of claim 21, wherein the electron injection region is formed from an n-type doped semiconductor.

28. (Original) The electroluminescent device of claim 27, wherein the n-type doped semiconductor is selected from the group consisting of ZnO, SnO.sub.2, In.sub.2O.sub.3, and GaN.

29. (Original) The electroluminescent device of claim 21, wherein the field effect gate structure is fabricated of transparent material.

30. (Original) The electroluminescent device of claim 21, wherein the field effect gate structure comprises: an injection control gate; and an injection control gate insulator layer interposed between the injection control gate and the inorganic phosphor.

31. (Original) The electroluminescent device of claim 30, wherein the injection control gate is formed from a transparent, conductive material.

32. (Original) The electroluminescent device of claim 31, wherein the transparent, conductive material is selected from the group consisting of In.sub.2O.sub.3, SnO.sub.2, and ZnO.

33. (Original) The electroluminescent device of claim 21, further comprising an electron injector contact in contact with the electron injection region.

34. (Original) The electroluminescent device of claim 33, wherein the electron injector contact is also in contact with the inorganic phosphor.

35. (Currently Amended) ~~The~~An electroluminescent device ~~of claim 1~~, comprising:

an inorganic phosphor configured to produce electroluminescence from the recombination of injected holes and injected electrons;

a controllable hole injection structure in contact with the inorganic phosphor; and

a controllable electron injection structure in contact with the inorganic phosphor and separated from the controllable hole injection structure by a recombination region of the inorganic phosphor wherein the controllable hole injection structure ~~comprises~~includes:

a hole injection region in contact with the inorganic phosphor and configured to receive a hole-injection bias voltage,

a hole injection control gate insulator layer in contact with the inorganic phosphor substantially opposite the hole injection region, and

a hole injection control gate in contact with the hole injection control gate insulator; and

wherein the controllable electron injection structure ~~comprises~~includes:

an electron injection region in contact with the inorganic phosphor and configured to receive an electron-injection bias voltage,

an electron injection control gate insulator layer in contact with the inorganic phosphor substantially opposite the electron injection region, and

an electron injection control gate in contact with the electron injection control gate insulator.

36. (Original) The electroluminescent device of claim 35, wherein the hole injection region is located on the opposite side of the inorganic phosphor from the electron injection region.

37. (Original) The electroluminescent device of claim 36, wherein a portion of the hole injection control gate is opposite a portion of the electron injection control gate.

38. (Original) The electroluminescent device of claim 35, wherein the hole injection region is located on the same side of the inorganic phosphor as the electron injection region.

39. (Original) The electroluminescent device of claim 35, wherein the hole injection control gate insulator and the electron injection control gate insulator are formed of a single layer.

Claims 40-63 (cancelled)